

REMARKS

By the present amendment, claims 18-20, 22, 23, and 25 have been cancelled. Upon entry of this amendment, claims 1-7, 10, 26, 39-46, 52 -65 will be pending in the application.

Claim Rejections - 35 U.S.C. § 103

Claims 1-7, 10, 53-58 and 64-65 have been rejected as being obvious over U.S. Patent No. 3,506,475 to MacDonnell in view of U.S. Patent No. 6,165,572 to Kahlbaugh, either alone or in combination with other secondary references.¹

MacDonnell discloses a filter element 12 for a high pressure locomotive lubrication system and directly addresses the issue of "inadequate media strength." Specifically, when the filter element 12 is positioned around a perforated central core 11, radially inward oil flow "dimples" the portions of the inner peaks into the core's perforations thereby plugging these holes and causing flow resistance. MacDonnell solves this "plugging" problem by depositing a separate adhered reinforcement bead along each of the inner pleat peaks.

Another problem addressed by the MacDonnell patent involves the pleat collapsing that occurs due to a cold oil surge (e.g., engine startup). Apparently, the collected deposits on pleat faces can cause a collapsed pleat to stick or cake on the next adjacent pleat so that the collapse becomes permanent. MacDonnell solves this problem by providing a netting 18 which functions as a "tension transmitting structure for ganging the pleats." In this manner, adjacent pleats are connected in a mechanically ganged relationship so that the circumferential flexing of any one pleat involves the circumferential flexing of a plurality of successively adjacent pleats. The stored energy is collectively applied through the netting 18 to effect positive return movement of the collapsed pleat in spite of any tendency to stick.² Significantly,

1. Specifically, claims 1-3, 10, 53-58 and 64-65 have been rejected as being obvious over U.S. Patent No. 3,506,475 to MacDonnell in view of U.S. Patent No. 6,165,572 to Kahlbaugh; claims 4-5 have been rejected as being obvious over MacDonnell in view of Kahlbaugh and further in view of U.S. Patent No. 5,552,048 to Miller; claim 6 has been rejected as being obvious over MacDonnell in view of Kahlbaugh and Miller, and further in view of U.S. Patent No. 5,762,796 to Zraik and U.S. Patent No. 4,512,892 to Ganzi; and claim 7 has been rejected as being obvious over MacDonnell in view of Kahlbaugh, and further in view of Zraik and Ganzi.

2. Moreover, each time a pleat flexes, any deposit building up on that pleat ends to fracture and drop off so that the flexing action continually tends to maintain the filter surfaces at their desired original permeability.

MacDonnell expressly notes that "previous approaches have been directed at stabilizing the position of the pleats whereas in the present arrangement, the tendency to flex is freely permitted and is utilized to achieve improve filter performance."

Claims 1-7, claim 64 and claim 65 set forth that the filter media includes a filtration layer made of fiberglass or at least one polymer, and inner/outer layers made of a non-woven polymer. Claims 10 and 53-58 set forth that the filter media is formed from only cellulose-fiber-free and woven-mesh-free layers. These claims also each specify an exoskeleton support arrangement such that the filter media "is sufficiently supported without having cellulose-fiber and/or woven-mesh endoskeleton support layers." Claims 1-7, claim 64 and claim 65 also specify that the exoskeleton comprises a support screen bonded to peaks of the pleats to support the pleats in an appropriately spaced and non-collapsed condition.

It is respectfully submitted that the applied art does not show or suggest the claimed invention. The MacDonnell netting 18 is not an exoskeleton, as its express purpose is to allow the pleats to collapse during cold surges. As such it is unclear as to whether the cellulose-free Kahlbaugh filter media would function in a MacDonnell-like filter arrangement, much less provide a "relatively long life in a relatively efficient system." The secondary references (Miller, Zraik, and Ganzi) do nothing to cure the shortcomings of the proposed MacDonnell/Kahlbaugh combination.

Claims 26, 39-41, 44-46, 52, 59 and 61-62 have been rejected as being obvious over MacDonnell in view of Miller. Claims 42-43, 60 and 63 have been rejected as being obvious over MacDonnell in view of Miller and further in view of U.S. Patent No. 6,331,223 to Wylie.

Claims 26 and 59-63 set forth that the exoskeleton support structure comprises a support screen that is non-adhesively attached to the peaks and that support screen exoskeletonally supports the pleats in an appropriately spaced and non-collapsed condition. Claims 39-45 set forth an exoskeleton support screen that is thermally bonded to each of the peaks thereby exoskeletonally supporting the pleats in a spaced and non-collapsed condition. Claim 46 and claim 52 each set forth an exoskeleton support screen that is bonded (non-adhesively and/or thermally) to each of the radially-inner peaks to support the pleats in an appropriate spaced and non-collapsed condition.

As was explained above, the MacDonnell netting 18 is not an exoskeleton, as its express purpose is to allow the pleats to collapse during cold surges, accordingly, it does not support the filter pleats in a spaced and non-collapsed condition. Miller and/or Wylie do not cure this shortcoming and, moreover, it is unclear whether the Miller mesh material and/or a Wylie screen material would accomplish the intended tension-transmitting function of the MacDonnell netting 18. With particular reference to claim 46

and claim 52, they specify that the exoskeleton support screen is bonded to the radially-inner peaks of the filter pleats. This would not be possible in the MacDonnell filter as the inner peaks are provided with a reinforcement adhesive bead for anti-plugging purposes.

Conclusion

In view of the foregoing, this application is now believed to be in a condition for allowance and an early action to that effect is earnestly solicited.

Respectfully submitted,

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